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environmental compliance & consulting

February 14, 2005

Mr. Art Williams
Director
Louisville Metro Air Pollution Control District
850 Barret Avenue
Louisville, Kentucky 40204-1745

Re: Observations on Proposed STAR Program Regulations

Dear Mr. Williams:

Our company is an environmental consulting firm whose clients and prospective clients include industrial facilities who will be affected by the District's Strategic Toxic Air Reduction (STAR) program. Accordingly, we have been very interested in the development of the STAR program over the past several months. We have also been following the activities of the Kentucky EPPC toxic air pollutant work group which is considering the state-level impact of and possible regulatory response to air toxic emissions. Finally, we are knowledgeable of ongoing federal efforts to reduce residual risk from air toxics not fully addressed by existing MACT standards.

As responsible environmental professionals, we are concerned about some disparities that we have observed among these various regulatory initiatives. We have also identified, in the STAR program, inconsistencies with generally accepted risk assessment practices and questions about the scientific basis for certain program requirements. Finally, we are aware that the STAR program's current trajectory would cause it to set a new national precedent, and we would like to see Jefferson County regarded favorably and positioned to retain and attract major businesses. Therefore, we wish to raise to your attention questions about the following aspects of the proposed STAR program:

- The proposed EALs regulate local facilities far beyond the federal standard,
- STAR's underlying presumptions cause modeling results to be extremely conservative,
- HQ limits less than 1.00 are not necessarily any more protective of public health, and
- STAR targets certain air toxics not identified as posing any excessive risk.

Proposed EALs Regulate Local Facilities far beyond Federal Standard

The most obvious observation about the STAR program is the District's incongruency with generally accepted federal risk goals and standards. "One in a million" and "ten to the minus six" have become daily terminology for so many persons interested in the County's program. However, the expectation that cancer risks should or will be held to a nonnegotiable standard of

1.0×10^{-6} (i.e., "one in a million") has resulted in proposed local regulations that go far beyond the federal residual risk standard.
Generally speaking, a risk of 1.0×10^{-6} is a commonly employed screening level against which to evaluate the cancer risk of a substance (or activity). Those exposures or activities that are deemed to pose a risk less than 1.0×10^{-6} are generally considered to be within an "ample margin of safety" and no further evaluation is necessary. That is, the 1.0×10^{-6} metric screens out conditions that should be of no concern whatsoever. Standard professional use of such a metric, however, does not usually imply that any risk above this level is entirely unacceptable.

U.S. EPA toxicologists who are developing the national residual risk standards have recently confirmed such in their January 26 presentation to the Kentucky EPPC toxic air pollutant work group. Risk assessment experts Dr. Dave Guinupp and Dr. Kenneth Mitchell agreed that a risk level of 1.0×10^{-6} is the federal agency's target *goal* for risk from exposure to air toxics from any source. However, they were also very clear in stating that U.S. EPA does not seek to impose that screening level as any sort of a regulatory standard, and they do not expect strict adherence to such by any industrial facility. Instead, they reported, U.S. EPA applies a standard of 1.0×10^{-4} – that is, a risk of 100 in a million – as their upper end limit of acceptable risk.

Accordingly, rather than drawing a single bright line in the sand, U.S. EPA evaluates cancer risk from individual facilities in terms of three "relevant cancer risk ranges," as follows:

A risk range less than or equal to 1.0×10^{-6} is considered to meet an "ample margin of safety," and no further assessment is necessary.
A risk range greater than 1.0×10^{-4} (or 100×10^{-6}) is considered "unsafe," and additional action is needed to reduce risks.
A risk range from 1.0×10^{-6} to 1.0×10^{-4} (or 100×10^{-6}) is considered to be within an "ample margin of safety with consideration of costs, technical feasibility, and other factors."

That is, the federal agency allows cumulative risk from individual facilities to approximate 1.0×10^{-4} (or 100×10^{-6}), as long as the facility can demonstrate that it has considered the availability and cost-effectiveness of potential emission controls.

These federal risk ranges provide a much more flexible approach to risk regulation than that proposed in the District's STAR program, which seems to be inconsistent with widely accepted and peer-reviewed risk assessment and management practices.

Under draft Reg. 5.21, Section 2.5.3, cumulative risk from a single facility would be capped at 7.5×10^{-6}. When compared to EPA's ceiling of 100×10^{-6}, this proposed STAR standard is over 13 times more stringent than the federal regulators allow.

Further, draft Reg. 5.21 also proposes, at Section 2.8.2, a regional risk goal of 10.0×10^{-6} for exposures to all carcinogenic TACs from all processes at all facilities that might impact a single receptor. Not only is this proposed risk level 10 times more stringent than U.S. EPA's upper end facility limit of 100×10^{-6}, but it attempts to apply this level as a community-wide limit. The EPA risk assessment experts who spoke to the Kentucky air toxics work group denied that the federal agency has any corresponding methodology for summing risks from neighboring

facilities, much less regulating such. To do so is contrary to responsible urban planning practices and would lead to sprawl, as such a policy explicitly discourages the co-location of industrial facilities that might otherwise share the cost of a specialized infrastructure, utility grid, and transportation system. For this reason, any cumulative risk goal should be removed from Section 2.8.2 of Regulation 5.21 altogether.

To summarize, there appears to be broad, general consensus that a process-specific risk goal of 1.0×10^{-6} is an appropriate target, and it is appropriate to include such an EAL in draft Regulation 5.21 at sections 2.2.1 and 2.5.1 as a risk goal. However, the risk standard for all TACs from all processes at an individual stationary source proposed at Section 2.5.3 would more accurately reflect current risk assessment standards if it were revised to state the EPA-employed upper end facility limit of 100×10^{-6}. An intermediate goal for all new or modified processes (see Section 2.2.3) may be appropriate, but the proposed goal of 3.8×10^{-6} seems very restrictive; perhaps a stakeholder session could be scheduled to discuss an appropriate target for new emission units. Finally, the community-wide goal of 10.0×10^{-6} at Section 2.8.2 is not reflected in any established risk management protocols, is contrary to responsible urban planning practices, and we question its appropriateness and inclusion in the STAR program.

Underlying Presumptions Cause Modeling Results to be Extremely Conservative

Not only are the risk standards proposed by STAR already very conservative, but additional layers of caution built into the STAR program make application thereof even more restrictive than other jurisdictions' programs. Specifically, the STAR program's definition of "ambient air" and the District's policy decisions regarding same require facilities to evaluate compliance at locations where 70-year continuous exposure simply could not or would not occur.

The Unit Risk Estimates (UREs) used in draft Reg. 5.20 to develop Benchmark Ambient Concentrations (BACs) have been developed by independent toxicological studies and are incorporated into peer-reviewed databases such as U.S. EPA's Integrated Risk Information System (IRIS). (Although we note that not all UREs used in the STAR program come from the federally recognized IRIS list.) These UREs have been developed considering potential 70-year residential exposure to chemicals in the air. The UREs are further weighted to the conservative end of the spectrum by considering the potential health effects on sensitive populations (including children and the elderly).

The proposed STAR program not only requires facilities to use BACs based on the conservative UREs, but the program adds yet another layer of stringency by requiring comparison to these BAC limits at the facility fenceline, even when no one would ever reside there. Further, in public forums held during STAR's informal comment period, the District has indicated that its policy may require this comparison to be made at the actual, physical fenceline even if the facility property extends further. For example, where a security fence may be erected within the property boundaries, with landscaping and publicly accessible parking lots and driveways outside the fenceline but still onsite, STAR would require application of the BAC standard to 70-year exposures at the fenceline itself, a location where no individual would ever reside, much less receive a 70-year exposure.

The District has also stated that its policy may require comparison to the BACs at offsite locations that might be public roadways, parking lots, retail centers, and even neighboring industrial facilities – all locations where no individual would ever receive a 70-year exposure.

This additional layer of stringency is not supported by U.S. EPA risk assessment practices. Instead, a common risk assessment methodology incorporates evaluation of risk at the population centroid of the nearest census tract – a location that would realistically reflect a possible 70-year exposure. Alternately, one might model exposures to the nearest residence (a.k.a. the maximum exposed individual or nearest receptor). But to evaluate risk where no one would reasonably receive a 70-year exposure is unnecessarily restrictive and would require facilities to make costly reductions that would not be necessary to limit actual persons' real world exposures.

HQ Limits Less than 1.00 are Not Necessarily any More Protective of Public Health

Proposed Regulation 5.21 introduces the "hazard quotient" (HQ) as a metric for evaluating the likelihood that a noncarcinogenic toxic air contaminant will cause an adverse health effect. Section 1.4 defines HQ as "the ratio between the concentration of a TAC and the benchmark ambient concentration for noncarcinogenic effects for that TAC (BAC_{NC})." In calculating this unitless ratio, an HQ of 1.00 reflects the threshold at which the concentration of the noncarcinogenic TAC in ambient air is believed to have the potential to cause an adverse health effect. Any calculated HQ less than 1.00 indicates that no adverse health effect is expected to occur.

However, Reg. 5.21 goes on to establish environmentally acceptable levels (EALs) for noncarcinogens well below this threshold. Specifically, Sections 2.2.1 and 2.5.1 both propose an HQ goal less than or equal to 0.20 for each TAC from each individual process. Section 2.2.2 proposes an HQ goal of 0.38 for each TAC from all new or modified processes combined, and Section 2.5.2 proposes an HQ standard of 0.75 for each TAC from all facility processes combined.

These EALs below an HQ of 1.00 are not any more protective of public health. Rather, this unitless metric would be more appropriately applied like a true/false test. That is, an HQ greater than 1.00 has the potential for an adverse health effect (note that even at this level it still only reflects the *potential* for an adverse health effect, not the certainty that one will occur). An HQ less than or equal to 1.00 is believed to not have any potential for adverse health effect, conservatively extrapolated from exposure studies. Therefore, TAC emissions from a source could have a calculated HQ of 0.20 or 0.38 or 0.75 or 0.99 and all be equally protective of human health – at all four of these HQ levels, no adverse health effect is expected to occur. No effect is no effect is no effect is no effect.

However, for facilities that must demonstrate compliance with the established EA levels, significant costs might be incurred to reduce a calculated HQ of, for example, 0.50 down to the proposed level of 0.20. The way Reg. 5.21 is currently written, a facility would have to invest in appropriate emission reductions with no corresponding improvement to public health. Both levels are below the concentration at which any adverse health effect is expected to occur, but one requires more investment than the other – and for no demonstrated reason.

When the District was recently asked about this apparent discrepancy, they expressed their concern that unit-specific HQ goals were set at 0.20 to allow for facilities to operate several units emitting the same noncarcinogenic TAC in close proximity to each other, while still maintaining an endpoint HQ of 1.00 for all emissions of all noncarcinogenic TACs from all nearby sources with the same exposure receptor.

First, it is not appropriate to establish EALs for cumulative emissions from independent facilities, as summing across facilities is inconsistent with federal EPA methodologies. It is also contrary to responsible urban planning practices and will lead to sprawl. Instead, it explicitly discourages the co-location of industrial facilities that might otherwise share the cost of a specialized infrastructure, utility grid, and transportation system. For this reason, any cumulative HQ goal should be removed from Section 2.8.1 of Regulation 5.21 altogether. Additionally, the District should take enforcement actions or impose more stringent requirements against a compliant facility for existing and/or future conditions at a neighboring facility.

Second, if one were to regard an HQ of 1.00 as an overall endpoint, as the District admittedly does, its most stringent application should only be as a goal EAL for all processes emitting a common TAC at a single facility. This would replace the HQ standard of 0.75 at Section 2.5.2 with an HQ goal of 1.00. Even then, however, such a proposed goal should remain negotiable to be consistent with U.S. EPA application thereof. That is, in its residual risk standards development process, the toxicologists at U.S. EPA have established a TAC-specific goal hazard index of 1.00. (EPA's term "hazard index" is, for purposes of this discussion, equivalent to the District's term "hazard quotient.") Facilities that can demonstrate onsite cumulative TAC-by-TAC hazards less than or equal to 1.00 are considered to have met an "ample margin of safety." However, EPA does allow facilities to emit air toxics with an associated hazard index greater than 1.00 considering costs to control, technical feasibility, and other factors. The federal agency does not establish an upper end hazard index beyond which concentrations are considered to be completely unacceptable; they report instead that such circumstances are evaluated on only a "case-by-case" basis.

Third, such an HQ goal of 1.00 at Section 2.5.2 should be the only targeted noncarcinogenic EAL of proposed Reg. 5.21. There is simply no scientific basis for any lower goals for single emission units or groups of emission units at the source, and enforcement of the proposed limits at Sections 2.2.1, 2.2.2, and 2.5.1 is unfair and unwarranted. While it recognized that the District desires intermediate limits to allow for the emission of a single TAC at more than one unit at a source, they ought not restrict within a facility's boundaries where emissions reflecting an HQ of up to the 1.00 goal may be generated. If a facility emits any single noncarcinogenic TAC from only a single process onsite, that process should be permitted to operate all the way up to the 1.00 threshold. Limiting the facility's operations to an HQ of only 0.20 is unnecessarily restrictive.

If the District is determined to retain the format of proposed Regulation 5.21, with separate EAL tables at sections 2.2 and 2.5, then it would be most fair to insert an HQ goal of 1.00 in each cell at sections 2.2.1, 2.2.2, 2.5.1, and 2.5.2. In this way, the District could continue to seek an EAL goal of 1.00 for each TAC from each facility, and facilities could retain the necessary operational flexibility to determine where noncarcinogenic emissions could be made.

STAR Targets Certain Air Toxics Not Identified as Posing Any Excessive Risk

Proposed Regulation 5.23, Section 1.1, identifies the Category 1 Toxic Air Contaminants (TACs) as "compounds monitored in the 2000 to 2001 *West Louisville Air Toxics Study* at a concentration representative of a cancer risk greater than 1.0×10^{-6} or a non-cancer Hazard Quotient (HQ) greater than 1.0." Accordingly, these Category 1 TACs are understandably the primary focus of the STAR program, and the regulations that require facility evaluation of such (1.06, 5.21, etc.) rightly prioritize these chemicals.

The STAR program goes on, however, to make evaluation of a second set of chemicals, the Category 2 TACs, a high second priority at existing sources. Regulation 5.23, Section 2.1, defines Category 2 TACs as "compounds with 2002 (TRI) reported air emissions for Jefferson County… with an EPA Risk-Screening Environmental Indicators (RSEI) Full Model Relative Risk Score equal to or greater than 500 that are not included in *Category 1 Toxic Air Contaminants*." However, this definition does not justify such rigorous evaluation under the STAR program. In fact, it instead seems to support the argument that Category 2 TACs need not be treated any differently from Category 3 or 4 TACs. That is, if it is a fact that the Category 2 TACs have historically been emitted within the county and reported on TRI reports, but it is also a fact that none of these additional chemicals were observed at excessive levels during the WLATS monitoring, then one can rightly argue that while they were flagged for potentially excessive risk, they apparently do not pose any actual excessive risk. Accordingly, if ambient concentrations of these Category 2 TACs are not already at elevated levels in Jefferson County, then why should existing sources expend so much time, effort, and resources to report enhanced emissions data and model emissions of these chemicals? Such investments are simply not justified where no existing risk has been identified.

It seems defensible to evaluate the potential future emissions of these Category 2 TACs from new or modified processes and process equipment, so as to reduce the potential for any excessive risks not already identified. Accordingly, Category 2 TACs should be treated the same as category 3 and 4 TACs and regulations 5.21, 1.06, et al, should be so amended.

Furthermore, using its own definition, the District targets two elemental metals that do not pose any elevated risk. As stated above, the District has defined a minimum RSEI score of 500 as the threshold for naming chemicals to the Category 2 list. However, based on 2002 TRI data, elemental manganese has a RSEI score of only 383, and elemental copper has a RSEI score of only 232. Accordingly, both should be dropped from the list of Category 2 TACs. It may be appropriate to continue to regulate manganese compounds (RSEI score = 8,498) and copper compounds (RSEI score = 2,347), but elemental manganese (a constituent of coal and natural gas combustion, as well as a component of steel) and elemental copper (a component of steel and a common pigment) do not meet the District's own criterion for Category 2 scrutiny. Elemental copper is not even an EPA-defined Hazardous Air Pollutant (HAP) and should be dropped from Regulation 5.23 altogether.

Finally, last November U.S. EPA delisted ethylene glycol monobutyl ether (EGBE, also known as 2-butoxyethanol or n-butyl celloslve) as a HAP. Therefore, Category 2 listed at Reg. 5.23 should be annotated to specifically exclude this non-HAP glycol ether from regulation under the STAR program.

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We appreciate this opportunity to make these technical observations on the District's STAR program. We support the goal of cleaner air in our community, and we want the Jefferson County program to be effective and appropriate.

Sincerely,

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Project Scientist

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